

12. A system for removing carbon monoxide from a hydrogen-containing treatment-object gas comprising two stages of CO removers for removing carbon monoxide, the first-stage CO remover removing a portion of the carbon monoxide by methanation thereof through a catalyst reaction by a first metal catalyst comprising one or more kinds selected from the group consisting of Ru, Pt, Rh, and Pd and capable of methanating carbon monoxide, the second-stage CO remover removing a remaining portion of the carbon monoxide mainly by oxidation thereof through a further catalyst reaction involving addition of an oxidizing agent.

13. The system for removing carbon monoxide, according to claim 12, wherein:
the first-stage CO remover includes the first metal catalyst and a first catalyst reaction condition setting mechanism for maintaining a catalyst reaction layer of the first-stage CO remover at a temperature required for methanation reaction of the carbon monoxide by the first metal catalyst; and

the second-stage CO remover includes a second metal catalyst capable of oxidizing the carbon monoxide, a second catalyst reaction condition setting mechanism for maintaining a catalyst reaction layer of the second-stage CO remover at a temperature required for the oxidation reaction of the carbon monoxide by the second metal catalyst, and an oxidizing-agent supplying mechanism for supplying the oxidizing agent required for the oxidation reaction with adjustment of the oxidizing agent addition amount.

14. The system for removing carbon monoxide, according to claim 12, wherein said treatment-object gas is a reformed gas obtained by reforming of fuel such as hydrocarbon, alcohol, naphtha, kerosene to be supplied as a fuel gas to a fuel cell.

15. A method of removing carbon monoxide from a hydrogen-containing treatment-object gas comprising:

a first step of causing the treatment-object gas to contact a first metal catalyst comprising one or more kinds selected from the group consisting of Ru, Pt, Rh, and Pd and capable of methanating carbon monoxide at a temperature where methanation of carbon monoxide takes place by the first metal catalyst so that a portion of the carbon monoxide is removed through carbon monoxide methanation; and

a second step of causing the treatment-object gas from the first step together with an oxidizing agent to contact a second metal catalyst capable of oxidizing carbon monoxide so that a remaining portion of carbon monoxide is removed mainly through carbon monoxide oxidation.

16. The method of removing carbon monoxide, according to claim 15, wherein in the first step, a reaction temperature of catalyst reaction between the first metal catalyst and the treatment-object gas is controlled to a temperature at which methanation of carbon monoxide may be promoted with restricting methanation of carbon dioxide, so as to reduce a carbon monoxide concentration of the treatment-object gas to approximately 50% or lower of an original carbon monoxide concentration of the treatment-object gas charged into this first step.

17. The method of removing carbon monoxide, according to claim 15, wherein in the second step, the second metal catalyst comprising one or more kinds selected from the group consisting of Ru, Pt, Rh and Pd is employed and

in the second step, a catalyst reaction layer is maintained at a temperature where oxidation of carbon monoxide takes place by the second metal catalyst involving addition of an oxidizing agent.

18. The method of removing carbon monoxide, according to claim 15, wherein a total amount of the oxidizing agent supplied at the second step is below about 3 chemical equivalents in oxygen conversion relative to an amount of carbon monoxide originally contained in the treatment-object gas introduced in the first step.

19. The method of removing carbon monoxide, according to claim 15, wherein a total amount of the oxidizing agent supplied at the second step is below the chemical equivalent in oxygen conversion relative to an amount of carbon monoxide originally contained in the treatment-object gas introduced in the first step.

20. The method of removing carbon monoxide, according to claim 15, wherein said hydrogen-containing treatment-object gas comprises a reformed gas supplied to a fuel cell as a fuel gas.

21. The system for removing carbon monoxide, according to claim 13, wherein said treatment-object gas is a reformed gas obtained by reforming of fuel such as hydrocarbon, alcohol, naphtha, kerosene to be supplied as a fuel gas to a fuel cell.

22. The method of removing carbon monoxide, according to claim 16, wherein in the second step, the second metal catalyst comprising one or more kinds selected from the group consisting of Ru, Pt, Rh and Pd is employed and

in the second step, a catalyst reaction layer is maintained at a temperature where oxidation of carbon monoxide takes place by the second metal catalyst involving addition of an oxidizing agent.

23. The method of removing carbon monoxide, according to claim 16, wherein a total amount of the oxidizing agent supplied at the second step is below about 3 chemical equivalents in oxygen conversion relative to an amount of carbon monoxide originally contained in the treatment-object gas introduced in the first step.

24. The method of removing carbon monoxide, according to claim 17, wherein a total amount of the oxidizing agent supplied at the second step is below about 3 chemical equivalents in oxygen conversion relative to an amount of carbon monoxide originally contained in the treatment-object gas introduced in the first step.

25. The method of removing carbon monoxide, according to claim 22, wherein a total amount of the oxidizing agent supplied at the second step is below about 3 chemical equivalents in oxygen conversion relative to an amount of carbon monoxide originally contained in the treatment-object gas introduced in the first step.

26. The method of removing carbon monoxide, according to claim 16, wherein a total amount of the oxidizing agent supplied at the second step is below the chemical equivalent in oxygen conversion relative to an amount of carbon monoxide originally contained in the treatment-object gas introduced in the first step.

27. The method of removing carbon monoxide, according to claim 17, wherein a total amount of the oxidizing agent supplied at the second step is below the chemical equivalent in oxygen conversion relative to an amount of carbon monoxide originally contained in the treatment-object gas introduced in the first step.

28. The method of removing carbon monoxide, according to claim 22, wherein a total amount of the oxidizing agent supplied at the second step is below the chemical equivalent in oxygen conversion relative to an amount of carbon monoxide originally contained in the treatment-object gas introduced in the first step.

29. The method of removing carbon monoxide, according to claim 16, wherein said hydrogen-containing treatment-object gas comprises a reformed gas supplied to a fuel cell as a fuel gas.

30. The method of removing carbon monoxide, according to claim 17, wherein said hydrogen-containing treatment-object gas comprises a reformed gas supplied to a fuel cell as a fuel gas.

31. The method of removing carbon monoxide, according to claim 18, wherein said hydrogen-containing treatment-object gas comprises a reformed gas supplied to a fuel cell as a fuel gas.

32. The method of removing carbon monoxide, according to claim 19, wherein said hydrogen-containing treatment-object gas comprises a reformed gas supplied to a fuel cell as a fuel gas.

33. The method of removing carbon monoxide, according to claim 22, wherein

said hydrogen-containing treatment-object gas comprises a reformed gas supplied to a fuel cell

as a fuel gas.

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